Lower Eastern Shore

SAV Distribution

The well-defined linkage between water quality and submerged aquatic vegetation (SAV) distribution and abundance make SAV communities good barometers of the health of estuarine ecosystems (Dennison *et al.*, 1993). SAV is important not only as an indicator of water quality, but it is also a critical nursery habitat for many estuarine species. Blue crab post-larvae are 30 times more abundant in SAV beds than adjacent unvegetated areas (Orth, 1992). Similarly, several species of waterfowl are dependant on SAV as food when they over-winter in the Chesapeake region (Perry and Deller, 1995).

SAV distribution is determined through the compilation of aerial photography directed by the Virginia Institute of Marine Science. Reports detailing methodology and annual SAV coverage are available at www.vims.edu/bio/sav. Details on species of SAV discussed in this report can be found at www.dnr.maryland.gov/bay/sav/key.

Habitat Status

The Chesapeake Bay Program has developed new criteria for determining SAV habitat suitability of an area based on water quality. The "Percent Light at Leaf" habitat requirement assesses the amount of available light reaching the leaf surface of SAV after being attenuated in the water column and by epiphytic growth on the leaves themselves (Kemp *et al.,* 2004). The document describing this new model is found on the Chesapeake Bay Program website (www.chesapeakebay.net/pubs/sav/index.html). The older "Habitat Requirements" of five water quality parameters are still used for diagnostic purposes (Dennison *et al.*, 1993).

Honga River

Honga River had impressive gains in SAV coverage from 1984 until 1993, at which time the abundance (4,560 acres) was near the revised goal of 7,686 acres (**figure 1a**). Since 1993, SAV coverage declined precipitously to a low of 782 acres in 1998, and has been recovering since. The 2002 coverage was up significantly to 6,320 acres (82% of the goal), the highest ever recorded, but coverage declined to 2,844 acres in 2003 and rebounded to 3,431 acres in 2004. Ground-truthing by citizens and staff from Chesapeake Bay Foundation, Salisbury State University and VIMS has found widgeon grass and horned pondweed in this region. There is no water quality monitoring station in the Honga, so it is not possible to assess attainment of the SAV habitat requirements.

Fishing Bay

Fishing Bay also had impressive gains in SAV coverage from 1987 to 1994 (**figure 1a**),

reaching 64 acres in 1993, or 32% of the revised goal of 193 acres. However, SAV abundance declined in 1995 and was absent in 1996 through 1998. 5 acres of SAV was identified in 1999 and 6 acres in both 2000 and 2001. Coverage soared in 2002 to 109 acres (or 56% of the goal), but then declined to 17 acres in 2004. There is no ground-truthing information from Fishing Bay. Water quality data from the monitoring station located near Roasting Ear Point indicates that only phosphorous and nitrogen concentrations meet the SAV habitat requirements (**figure 2a**), with suspended solid and algae levels borderline. Light attenuation and percent light at leaf fail the SAV habitat requirements.

Nanticoke River

In the Nanticoke River, SAV has never been mapped by the Virginia Institute of Marine Science aerial survey (**figure 1b**) and there is not a goal in this area. In 1996, a citizen ground-truthing the upper part of the river did find wild celery, coontail, hydrilla, slender pondweed, an unidentified naiad, and other unidentified species of SAV in Gales Creek, near the Maryland/Delaware state line. Also, staff from EPA did find horned pondweed in Shiles Creek in 1996. A wild celery *(Vallisneria americana)* transplant was tested on Marshyhope Creek in 2001 and 2002, a tributary of the Nanticoke, near the town of Federalsburg. This transplant failed, due to grazing and borderline conditions. Water quality data from the monitoring station located near the bridge at Sharpstown (tidal fresh region) indicates that algae and phosphorous levels passing, total suspended solids are borderline and light attenuation and percent light at leaf fail (**figure 2b**). Nitrogen levels are not applicable in this tidal fresh region. In the lower Nanticoke River (mesohaline) the water quality monitoring data from the station located near Wetipquin Neck indicates that phosphorous and algae levels pass the SAV habitat requirements, while percent light at leaf, light attenuation and concentration of suspended solids and nitrogen fail these requirements.

Wicomico River

In this river, SAV has never been mapped by the Virginia Institute of Marine Science aerial survey (**figure 1b**) and there is not a goal in this area. Ground-truthing by staff from EPA did find horned pondweed in Wetipquin Creek. Data from the water quality monitoring station located at Whitehaven indicates that algae levels pass and phosphorous are borderline to the SAV habitat requirements (**figure 2b**). Suspended solids and nitrogen levels, percent light at leaf and light attenuation failed the SAV habitat requirements.

Manokin River

The Manokin River has had highly variable SAV coverage (**figure 1a**) as mapped by the Virginia Institute of Marine Science aerial survey, particularly in recent years (since 1994). In this time frame, SAV abundance has ranged from a low of 20 acres to a high of 728 acres in 2002, or 17% of the revised goal of 4,369 acres. 2004 had 291 acres of SAV, with the decline most likely due to poor water quality as a result of extremely wet

years. These SAV Beds have all been mapped downstream of Locus Point. Ground-truthing by citizens and staff from VIMS between 1994 and 1998 has identified only widgeon grass in this area. Water quality data from the monitoring station located near Inverness indicate that levels of algae, nitrogen and phosphorous meet the SAV habitat requirement, suspended solids are borderline, while light attenuation and percent light at leaf fails (**figure 2b**).

Big Annemessex River

This river has had fairly consistent SAV coverage of approximately 400 acres for the last 15 years (**figure 1a**), with some fluctuations as mapped by the Virginia Institute of Marine Science aerial survey. In 2002, SAV coverage was 782 acres, the largest ever recorded by VIMS, representing approximately 39% of the revised goal of 2,014 acres. 2004 showed 549 acres. No ground-truthing has occurred in this river. Water quality data obtained at a station located between Long and Scott Points indicate that concentrations of algae, suspended solids, nitrogen, and phosphorous meet the SAV habitat requirements. Light attenuation and percent light at leaf fail (**figure 2b**).

Pocomoke River

In the Pocomoke River, upstream of Williams Point, Virginia Institute of Marine Science has never mapped SAV in the annual aerial survey, and there is no Tier I goal (**figure 1b**). In addition, there are no ground-truthing sites in this area. Data from the water quality monitoring station located at the drawbridge in Pocomoke City indicates that only algae and suspended solids levels passed the SAV habitat requirements, while percent light at leaf, light attenuation, and phosphorous concentrations failed. Nitrogen levels are not applicable in this oligohaline environment (**figure 2b**).

Pocomoke Sound

Pocomoke Sound has had fairly consistent SAV coverage as delineated by the VIMS aerial survey, with abundance peaking in 1993 at 1,916 acres or 47% of the revised goal (4,092 acres) (**figure 1a**). Since then, however, SAV coverage fell to 59 acres in 2001 and 2003 and 69 acres in 2004, though 2002 witness the second highest recorded value (1,812 acres). Most of the SAV beds are located between Oystershell Point and the Cedar Straights. Ground-truthing by VIMS staff in the area has found widgeon grass and eelgrass. Data from the water quality monitoring station located in the middle of Pocomoke Sound, near state line marker “A”, indicates that concentrations of algae, nitrogen and phosphorous concentrations pass, suspended solids concentration is borderline and light attenuation and percent light at leaf fail relative to the SAV Habitat Requirement (**figure 2a**).

Tangier Sound

Tangier Sound had a good resurgence of SAV, hitting a high of 18,113 acres in 1992, 48% of the revised goal of 37,965 acres (**figure 1a**). Since then, SAV suffered massive

declines to a low of 6,612 acres in 1998. 2002 witnessed a rebound to 15,023 acres, though coverage has fallen to 8,539 acres in 2004. This decline is most likely due to the poor water quality resulting from having a near record rainfall year in 2003. Ground-truthing by a citizen and VIMS staff has found widgeon grass and eelgrass throughout Tangier Sound. There are two water quality monitoring stations in Tangier Sound (one near Sharkfin Shoal, the other off of Island Point, near Janes Island), and these data indicate that algae, nitrogen, phosphorous, suspended solids concentrations pass and light attenuation and percent light at leaf are borderline to the SAV habitat requirements (**figure 2a**).

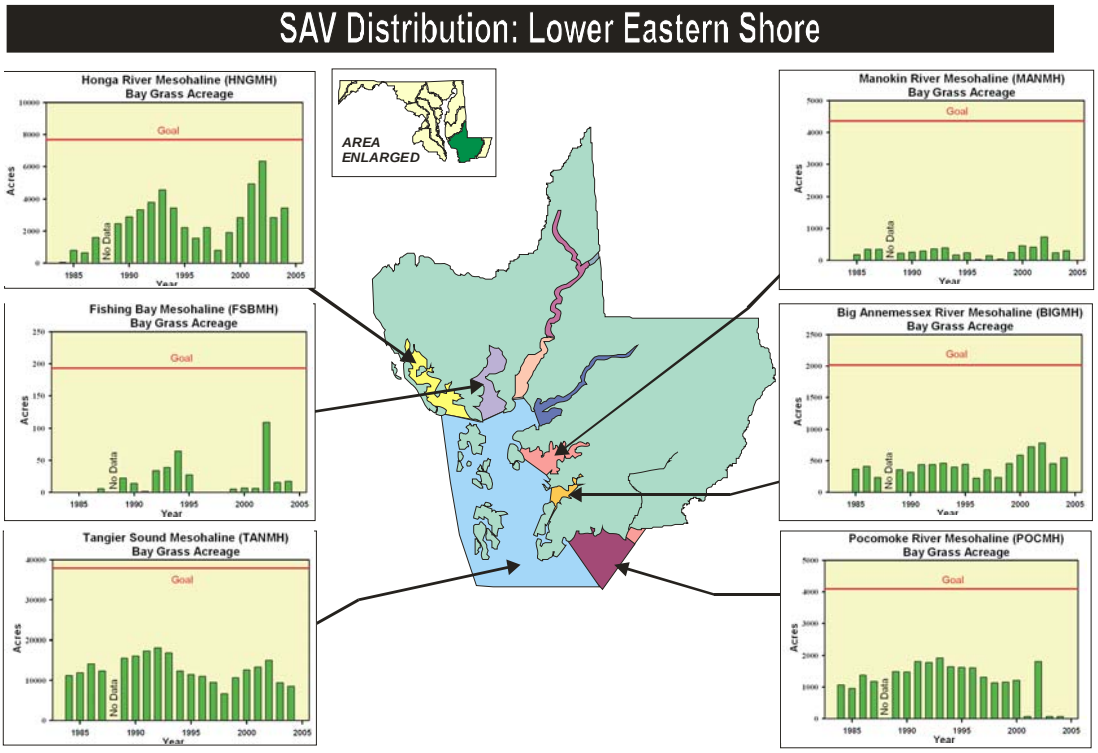

Figure 1a: SAV coverage on the Lower Eastern Shore, 1984 to 2004

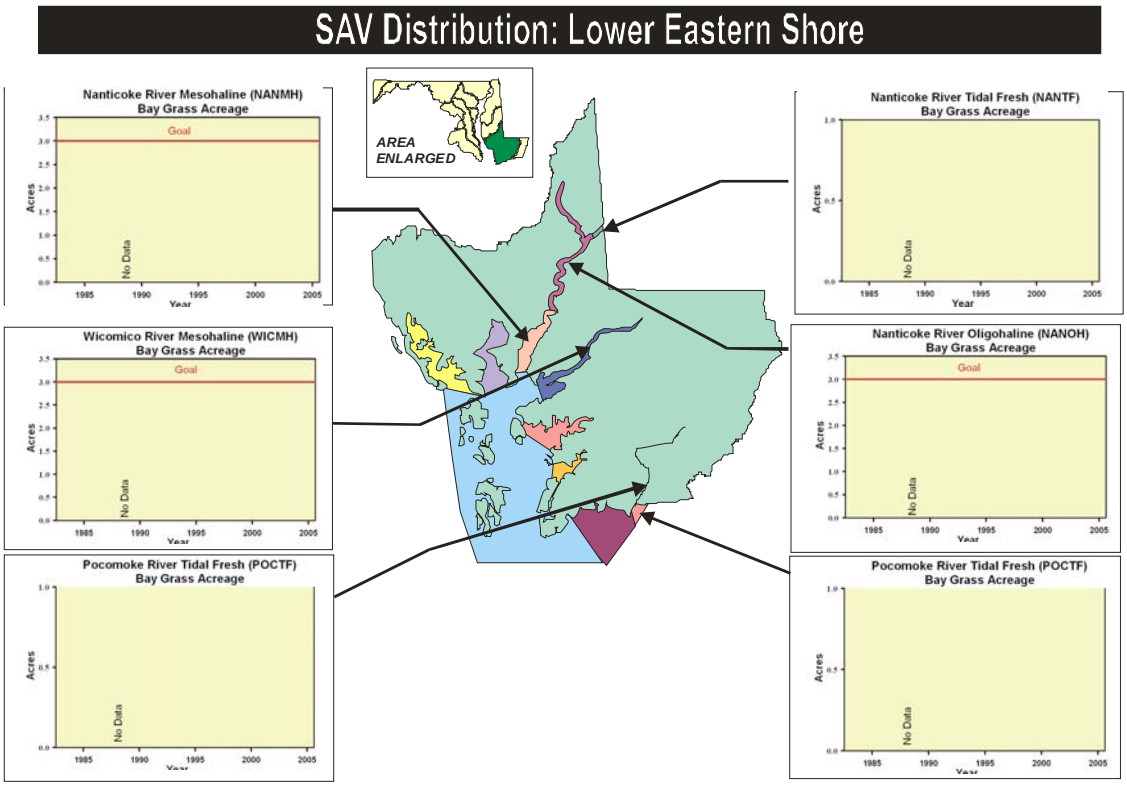

Figure 1b: SAV coverage on the Lower Eastern Shore, 1984 to 2004

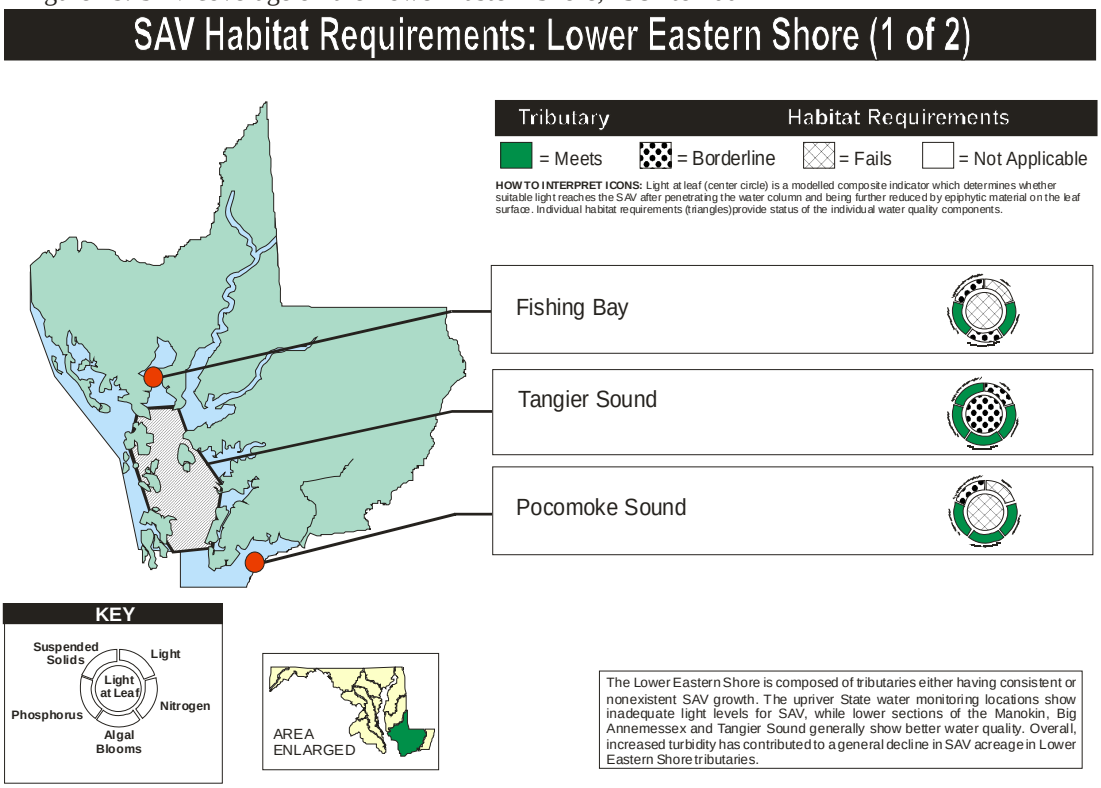

Figure 2a: SAV habitat requirement attainment on the Lower Eastern Shore.

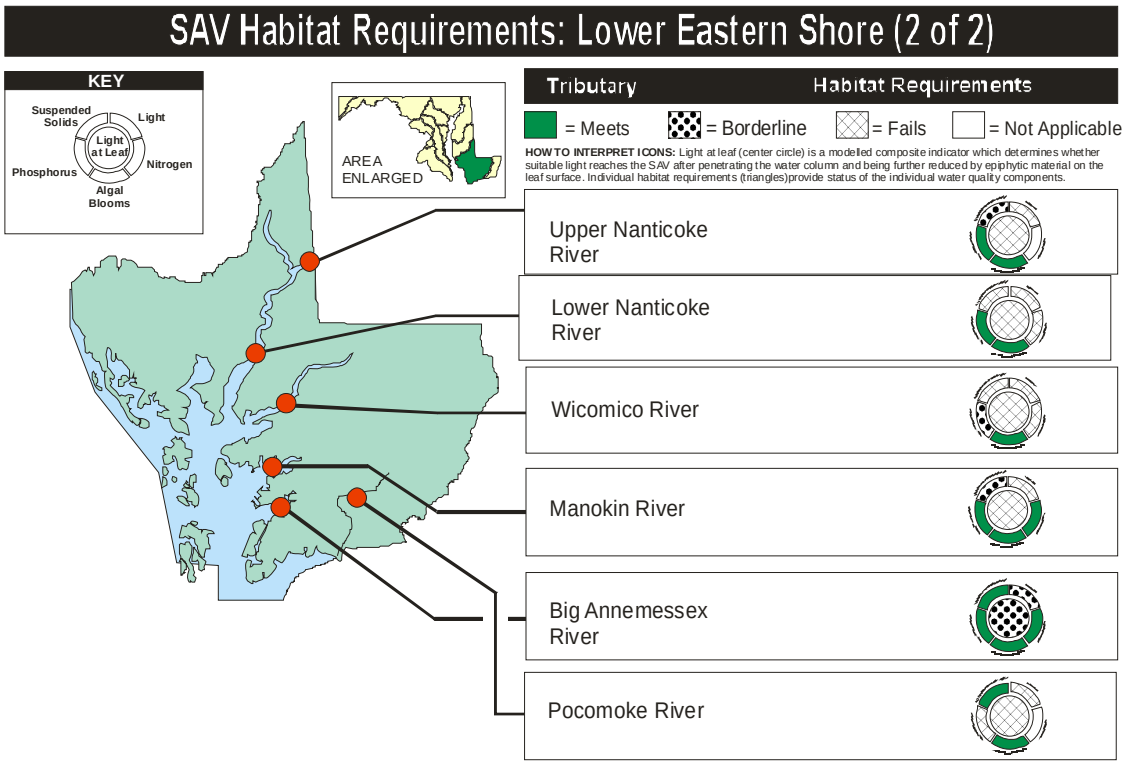

Figure 2b: SAV habitat requirement attainment on the Lower Eastern Shore.

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